

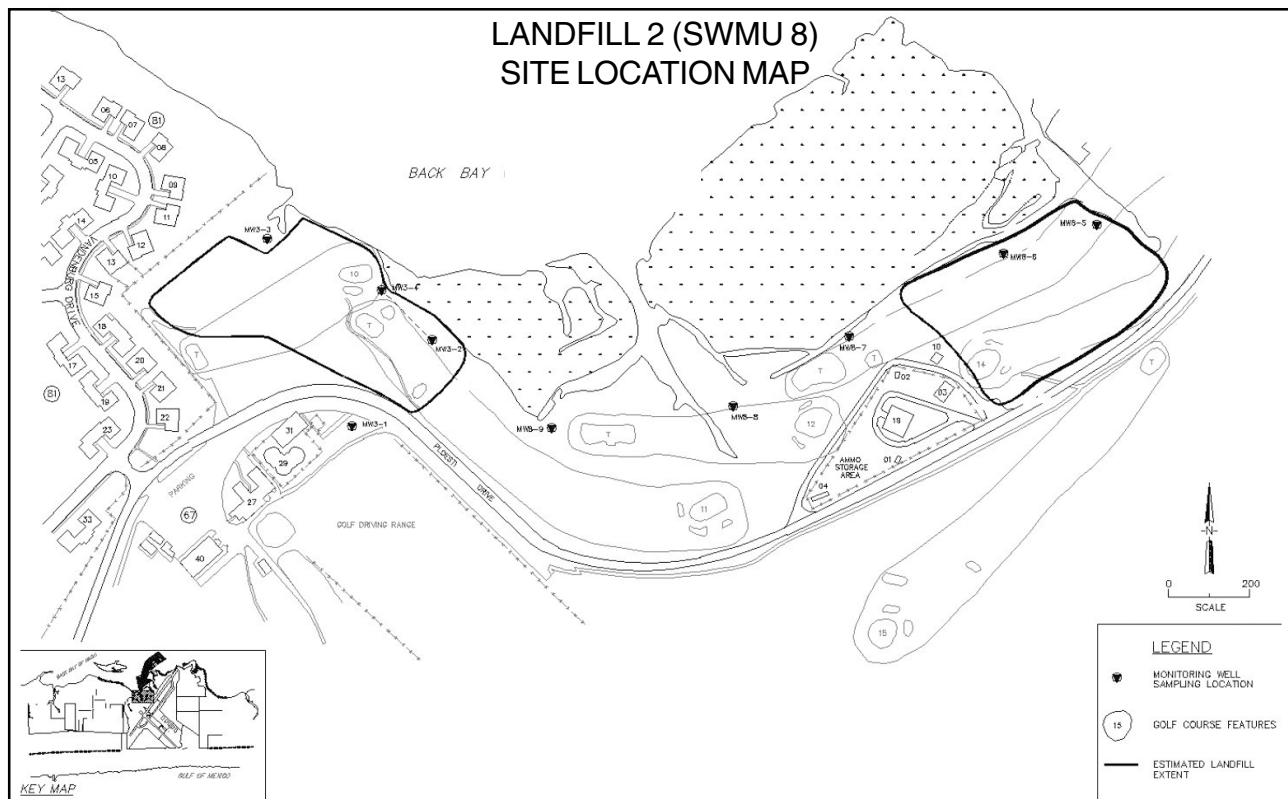


KEESLER AIR FORCE BASE INSTALLATION RESTORATION PROGRAM KEESLER AFB, MISSISSIPPI

Statement of Basis - Solid Waste Management Unit (SWMU) 8

IRP SITE DESIGNATION

Landfill 2: RCRA Site Code SWMU 8, IRP Site Code LF-02.



INTRODUCTION

Keesler AFB is located within the city limits of Biloxi, Mississippi, on the peninsula surrounded by the Back Bay of Biloxi and the Mississippi Sound. Landfill 2 (SWMU 8, LF-02) is located in the north-west part of the Base adjacent to the Back Bay of Biloxi. The landfill consists of two areas (East and West) that are approximately 6 acres each and are covered by the Base golf course. Landfill 2 was constructed as an unlined surface fill with approximately one foot of soil covering the refuse. The west-

ern part of the landfill was operated for one year, between 1947 and 1948. During its operation, weekly burnings were conducted in order to reduce the volume of the refuse. The eastern portion of the landfill was operated during the 1950's. Materials disposed in the landfill included normal base refuse, as well as waste paints, paint cans, and paint products.

This paper, called a Statement of Basis, is part of the cleanup planning process and is a requirement

of the Resource Conservation and Recovery Act (RCRA) permit issued to Keesler Air Force Base by the US Environmental Protection Agency (USEPA). The proposed final remedy (a low permeability cover, shoreline stabilization, sediment excavation and containment, long-term monitoring, and land use controls) is explained along with any other possible remedies that have been evaluated. Public comment and participation in the remedy selection process is requested.

The information presented in this Statement of Basis summarizes the information obtained from previous investigations conducted at SWMU 8 (LF-02). Detailed information concerning this unit can be found in the RCRA Facility Investigation Group 1 Sites Report (April 1999) and the Phase II Corrective Measures Study (CMS) Report (February 2001). These documents are available in the Administrative Record. The Administrative Record is located at the information repository identified later in this Statement of Basis.

The public is encouraged to comment and participate in the remedy selection. The public is also encouraged to review the Administrative Record. The USEPA will select a final remedy for SWMU 8 (LF-02) only after the public comment period has ended, and the comments are reviewed and considered.

PUBLIC COMMENT PERIOD AND PUBLIC MEETING

The public is encouraged to provide comments regarding the corrective action alternatives provided in the Phase II Corrective Measures Study Report (February 2001) and this Statement of Basis. The public is also invited to provide comments on corrective action alternatives not presented in the above-mentioned documents.

Important dates to remember

Public comment period begins:
December 20, 2001

Public comment period ends:
February 2, 2002

Please note, written comments must be postmarked no later than midnight **February 2, 2002**.

A public meeting will be held, if requested. During the public meeting, USEPA, the Mississippi Department of Environmental Quality (MDEQ), and the US Air Force will be available to respond to oral comments and questions.

Comments received will be summarized and responses will be provided in a Response to Comments Document. This document will be prepared following the close of the public comment period. The comments and the Responses to Comments Document will be included with the final permit modification in the Administrative Record.

The Administrative Record for SWMU 8 (LF-02) is available at:

Biloxi Public Library
Reference Section
139 Lameuse Street
Biloxi, Mississippi
Mon., Tue., Wed., 9 A.M. to 8 P.M.
Thu., Fri., Sat., 9 A.M. to 5 P.M.

To request further information please contact:

Ms. Lisa Noble
Keesler AFB, Mississippi
(228) 377-8255
lisa.noble@keesler.af.mil

or

Mr. Robert Pope
U.S. Environmental Protection Agency, Region IV
(404) 562-8506
pope.robert@epa.gov

or

Mr. Bob Merrill
Mississippi Department of Environmental Quality
(601) 961-5049
bob_merrill@deq.state.ms.us

Submit written comments to:
U.S. Environmental Protection Agency
Attention: Mr. Robert Pope
U.S. Environmental Protection Agency, Region IV
Federal Facilities Branch
61 Forsyth Street, SW
Atlanta, GA 30303-3104

Comments must be postmarked no later than midnight, **February 2, 2002**.

PROPOSED REMEDY

USEPA is proposing as a final remedy a low permeability cover, shoreline stabilization, excavation and containment of sediments, long-term monitoring of groundwater and sediments, and land use controls (LUCs). The LUCs will include land use restrictions, groundwater use restrictions, annual inspections, monitoring, and reporting.

SWMU 8 (LF-02) DESCRIPTION

Landfill 2 (SWMU 8, LF-02) is located in the northwest part of the Base adjacent to the Back Bay of Biloxi. The landfill consists of two areas of approximately 6 acres each that are currently covered by the Base golf course. Landfill 2 was constructed as an unlined surface fill with approximately one foot of soil covering the refuse. The west part of the landfill was operated for one year, between 1947 and 1948. During its operation, weekly burnings were conducted in order to reduce the volume of the refuse. This part of Landfill 2 is exposed to open water of the Back Bay and wetlands. A storm drain channel runs through the landfill and empties into the Back Bay. The east part of the landfill is located east of the Ammunition Storage Facility and was operated in the 1950's. Wetlands and tidal channels border this part of Landfill 2. Materials disposed in the landfill included normal base refuse, industrial waste, and construction waste, as well as waste paints, paint cans, and paint products. Both parts of Landfill 2 are currently covered by the Keesler Golf Course.

SWMU 8 (LF-02) INVESTIGATIONS AND HISTORY

In 1988, a metal detector survey was conducted to determine the approximate boundary of SWMU 8 (LF-02). The results of the survey also indicated possible buried metallic objects throughout the entire area. Groundwater and surface water samples were collected and analyzed in 1988 and 1989; the results indicated elevated concentrations of volatile organic compounds and inorganic compounds (metals).

A RCRA Facility Investigation (RFI) was started at SWMU 8 (LF-02) in 1992. The RFI in-

cluded the collection of geophysical data, soil data, the installation of groundwater monitoring wells, and the collection of surface water, sediment, and groundwater samples. Additional groundwater samples were collected in 1996 and analyzed for metals only. Additional sediment and surface water samples were collected from areas of the Back Bay of Biloxi in 1996 to fill data gaps in the 1994 Draft RFI. Fish and additional sediment samples were collected in 1997 and 1998. Testing was conducted to determine the toxicity of contaminants present in the sediments.

The results from samples collected from 1996 through 1998 were combined with data collected in earlier investigations in order to evaluate potential risks to aquatic receptors in the Back Bay of Biloxi near Landfill 2 and Landfill 3.

SWMU 8 (LF-02) INVESTIGATION RESULTS

Chemicals detected at SWMU 8 include semivolatile organics in sediments and surface soils; metals in surface soils, sediments, and groundwater; pesticides in surface soils, sediments, surface water, and groundwater; and volatiles in surface soils, sediments, surface water, and groundwater. Semivolatile organics, pesticides, and metals were detected in fish tissues. The extent of SWMU 8 was estimated based on the results of geophysical investigations and hand auger borings. The RFI and the Baseline Risk Assessment (BRA) concluded that the potential risk to human health is minimal. Potential ecological risks were identified for sediments. Potential risks from erosion and physical exposure were identified in the Phase II CMS Report (February 2001) for Landfill 2.

SUMMARY OF RISKS AT SWMU 8 (LF-02)

Soil, groundwater, surface water, sediment, and biota obtained during the RFI investigation and subsequent sampling events were used to evaluate human health and ecological risks associated with exposure to contaminants in the affected media. The RCRA Facility Investigation (RFI)/Group 1 Sites Report (April 1999) and the Phase II CMS Report

(February 2001) contain the details of the BRA for Landfill 2 and the Back Bay of Biloxi.

Human Health

For human health, USEPA Region IV has established a target level below which derived cancer risks and non-cancer hazards are considered to be acceptable. USEPA's target cancer risk range is between one in 10,000 (10^{-4}) to one in 1,000,000 (10^{-6}) for cumulative lifetime receptor risk. Risks were evaluated for current/future golfers, current/future recreational fishermen, current/future maintenance workers, future construction workers, and hypothetical future residents (both adults and children) and compared to the USEPA Region IV target levels.

All current and future receptors, except recreational fishermen, were expected to be exposed to contaminants in surface soil, and in addition, future maintenance workers and hypothetical future residents were expected to be exposed to groundwater. Hypothetical future residents and recreational fishermen were also assumed to consume fish in the vicinity of SWMU 8, and hypothetical future residents were expected to be exposed to surface water and sediment in the area.

Using USEPA Region IV methodology, Chemicals of Concern (COCs) were identified for the current/future fisherman and the hypothetical future resident (total scenario cancer risk greater than or equal to one in 10,000 (10^{-4}) and total scenario hazard noncancer effects greater than or equal to one). Al-

though COCs were identified for the hypothetical future resident, it should be noted that, given the current use of the site and anticipated future use as a recreational area (golf course), it is highly unlikely that residential development will ever occur at SWMU 8. Although the hypothetical future resident is not expected to live at the site, this group was included in the risk assessment to allow a health-protective evaluation of the soil and groundwater at SWMU 8. The total risks and hazards derived for all other receptors were below the USEPA target levels for cancer and non-cancer effects.

Human health COCs for SWMU 8 that were identified using USEPA Region IV guidance include: pesticides (aldrin, dieldrin, heptachlor) in fish; arsenic and barium in groundwater; and arsenic and benzo(a)pyrene in surface soil. The COCs underwent further screening including comparison to background values, ARARs, and uncertainty analysis. Final COCs are arsenic and benzo(a)pyrene in surface soil based on the hypothetical future resident receptor (Table 1). COCs were identified using MDEQ guidance also. Arsenic was the only COC identified and recommended for remediation (Table 1). However, the only receptor with an unacceptable derived risk is the hypothetical future resident, and since Landfill 2 is not likely to be developed for residential use due to the proximity of the airfield runway and wetlands, corrective action objectives were not developed for human receptors.

Table 1. Human Health COCs Identified at SWMU 8 (LF-02)

Medium	COC (1)	Maximum Detected (2)	Federal MCL (3)	MS MCL (4)	Exposure Routes (5)	Cancer Risk (6)	HQ (Non-cancer)
Soil	Arsenic	1.15E+01	NR	NR	Ingestion	9×10^{-6}	NA
Soil	Benzo(a)pyrene	1.80E-01	NR	NR	Ingestion	1×10^{-6}	NA

(1) Chemical of Concern (2) Maximum Detected value: Units in mg/L (water) or mg/kg (soil). (3) Maximum Contaminant Level, EPA 1996. Units in mg/L. (4) Maximum Contaminant Level, MSDEQ 1991. Units in mg/L. (5) Pathways of exposure resulting in a chemical being identified as a COC (6) Total risk = ingestion + dermal risk, where appropriate. (7) Total Hazard Quotient = ingestion + dermal HQ, where appropriate. NR = Not rated; NA = Not applicable

Ecological

A screening level ecological risk assessment was conducted at SWMU 8 (RFI Report April 1999). The golf course associated with SWMU 8 is maintained to discourage native species and the proximity of the airfield and level of human activity also discourages wildlife. For these reasons, SWMU 8 does not support terrestrial ecological values that require protection. As a result, the Keesler AFB partnering team agreed that no further terrestrial ecological investigations or assessments were required.

A baseline ecological risk assessment was conducted to assess risks to aquatic organisms from surface water and sediments in adjacent areas of the Back Bay of Biloxi. Analytical results from the RFI and CMS investigations were used to evaluate the aquatic ecological risks. The methodology used for the ecological risk assessment is detailed in the RFI Report (April 1999) and the Phase II CMS Report (February 2001). The criterion used to determine potential risk is a hazard quotient (HQ) greater than 1.

The initial phase of the ecological risk assessment (Phase 1) indicated potential risks to ecological receptors of the Back Bay of Biloxi and wetland areas fringing SWMU 8. These potential risks were further evaluated, concurrently with SWMU 9, in the Phase 2 ecological risk investigation and the results were published in the Phase II CMS Report (February 2001). Results of the sediment toxicity testing indicated adverse effects associated with sediment exposure on the growth and reproduction of amphipods. The results of the Phase 2 investigations indicate that there are predicted risks in sediments. COCs identified include bis(2-ethylhexyl)phthalate, benzo(a)pyrene, benzo(a)anthracene, chrysene, fluoranthene, pyrene, chlordane, DDE, DDT, DDD, arsenic, beryllium, cadmium, chromium, copper, lead, silver, and zinc.

The Corrective Action Objective (CAO) is the concentration of COCs at a particular site or location that indicates whether a risk is acceptable or whether some corrective action should occur at this location. A range of CAOs was identified for direct sediment toxicity and bioaccumulation of COCs. The CAOs were based on no observable adverse effect levels (NOAEL) and lowest observable adverse effect lev

Corrective Action Objectives (CAOs) were developed for these COCs and are shown in Table 2 and Table 3.

Table 2. Direct Sediment Toxicity Assessment Endpoint Ecological CAOs

COC	CAOs (mg/kg)
DDE	0.016 (N), 0.0273 (L)
DDD	0.0159 (N), 0.0233 (L)
Lead	80.2 (N), 142 (L)
Copper	19.9 (N), 25.6 (L)
Cadmium	1.1 (B), 1.5 (L)
Gamma Chlordane	0.0075 (N), 0.0144 (L)
Alpha Chlordane	0.0075 (N), 0.0109 (L)
Pyrene	0.68 (N), 0.86 (L)
Fluoranthene	0.81 (N), 1.2 (L)
Chrysene	0.4 (N), 0.56 (L)
Bis(2-ethylhexyl)phthalate	0.74 (N), 1.8 (L)
Benzo(a)anthracene	0.35 (N), 0.36 (L)
Benzo(a)pyrene	0.35 (N), 0.44 (L)

COC = Constituent of Concern;
CAO = Corrective Action Objective;

B = Background Mean;

N = NOAEL-based RGO;

L = LOAEL-based RGO;

Note: Background Mean was selected if higher than one or both of the NOAEL- and/or LOAEL-based RGO.

Table 3. Bioaccumulation Assessment Endpoint Ecological CAOs

COC	CAOs (mg/kg)
DDE	0.0031 (B)
DDT	0.0053 (B), 0.0257 (L)
Arsenic	11.2 (N, L)
Beryllium	0.625 (B)
Chromium	11.6 (B), 22.9 (L)
Silver	0.5 (B)
Zinc	247 (N), 1150 (L)

COC = Constituent of Concern;
CAO = Corrective Action Objective;

B = Background Mean;

N = NOAEL-based RGO;

L = LOAEL-based RGO;

Note: Background Mean was selected if higher than both the NOAEL- and LOAEL-based RGO.

CURRENT ACTIVITIES AT LANDFILL 2

The RFI/BRA for Landfill 2 was completed and published in April 1999. The Phase II CMS Report, including the final ecological risk assessment, was completed in February 2001. This Statement of Basis is based on the results and conclusions presented in the RFI and the CMS. The alternative proposed for the final corrective action is currently in the design phase. The design task includes a topographical survey of the site and a methane gas study. As soon as this SB is complete, and all comments have been received and the Response to Comments Document is finalized, the design will be completed and construction of the final corrective measures will be implemented.

CORRECTIVE ACTION SCOPE

The corrective actions proposed in this SB are intended to be the final remedial actions for Landfill 2. The proposed alternative was selected from the alternatives presented in the Phase II CMS Report (February 2001). It includes a low permeability cover, sediment excavation and containment, shoreline stabilization, long-term monitoring of groundwater and sediments, and land use controls. The low permeability cover will include a geosynthetic clay layer plus 1.5 feet of soil and topsoil, a methane venting and monitoring system, and a sprinkler system. It will be graded to promote drainage and planted with a grass/vegetative cover. Contaminated sediments will be excavated from drainage and tidal channels bordering Landfill 2. These sediments will be pumped to a geotextile tube placed inside the edge of Landfill 2 and covered by the low permeability cover.

The west end of Landfill 2 will be stabilized by placing a geotextile tube(s) along the exposed shoreline and filling the tube with clean sand. The area between the tube and the bank will be planted with native wetland plant species. An additional tube(s) will be placed perpendicular to the shoreline and filled with clean sand. This tube will cover contaminated sediments in the Back Bay and will act dissipate wind and wave energy and help prevent erosion. It should also encourage sedimentation and habitat enhancement.

Long-term monitoring (LTM) plans will be developed for groundwater and sediments at Landfill 2. A groundwater monitoring well network will be installed around Landfill 2 and these wells will be sampled for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polyaromatic hydrocarbons (PAHs), and metals. The LTM plan will propose annual groundwater monitoring for 5 years. Evaluation of the LTM will be performed at the 5-year point to determine future monitoring requirements. Following each sampling event, the analytical data will be evaluated for contaminant concentration trends. If concentrations fall below MCLs for three consecutive events, a recommendation for no further groundwater monitoring will be proposed to the regulatory agencies.

Long-term monitoring will be performed as a periodic evaluation of risk associated with the sediments also. An LTM plan for sediment monitoring will be prepared. The LTM plan will propose an initial round of sampling (baseline) that will cover the areas along the shoreline, in the channels, and in the marshes where ecological exposures are a concern. Sampling for both chemical concentrations (SVOCs, PAHs, pesticides, and metals) and toxicity will be performed. These results will be used to better define sampling locations for subsequent monitoring. Monitoring and evaluation of chemical constituents will occur annually for 5 years including baseline sampling. Toxicity sampling, analysis, and evaluation will occur at 5-year intervals. Evaluation of sediment LTM will be performed at the 5-year point to determine future monitoring requirements. A statistical analysis of the data will be performed. The LTM plan will define sampling locations, methods, analytical parameters, schedule, and comparison criteria. The overall goals of LTM are to observe a reduction in contaminant concentration over time and an increase in survival, growth, and reproduction of the benthic community.

Land use controls such as land use restrictions, groundwater use restrictions, construction prohibition, periodic inspections, and reporting requirements will be presented in a Land Use Control Implementation Plan (LUCIP) and an LTM Plan for this site. Annual inspections of the cover will be performed. Permanent monuments will be constructed and signs will be posted delineating the landfill boundaries.

CORRECTIVE ACTION ALTERNATIVE SUMMARY

Corrective action technologies and alternatives were screened and evaluated against selection criteria and COAs. The proposed remedy was found to be the best-suited alternative for protecting human health and the environment from potential risks associated with Landfill 2 (Phase II CMS Report, February 2001). The low permeability cover will provide protection to receptors by reducing the potential exposure to landfill debris and COCs. It will also prevent rainfall infiltration through landfill materials. Long-term groundwater monitoring will help limit receptor exposure to contaminated groundwater by periodic monitoring of COCs and continual evaluation of corrective action objectives and potential risk. Land use controls will protect receptors by restricting what types of activities can occur on Landfill 2, such as construction prohibition, land use restrictions, and periodic inspections of the cover. LUCs will also restrict groundwater use in the vicinity of Landfill 2. Excavation of sediment and placement into geotextile tubes eliminates the potential exposure risks in some areas through removal. Long-term monitoring will achieve the goals of observing a reduction in contaminant concentration over time and an increase in survival, growth and reproduction of the benthic community. Placement of geotextile tubes parallel to the shoreline and perpendicular to prevailing wind on the west end of Landfill 2 will achieve the goals of shoreline stabilization by acting as energy dissipation structures and promoting sediment deposition. The combination of these technologies is considered best suited to provide protection to human and ecological receptors over time.

